Digital Signal Processor (DSP) - Overview (7/93)

Article Created: 29 July 1993

TOPIC -----

This article gives a overview of the Digital Signal Processor (DSP) chip which is a part of the Macintosh Centris 660AV and Quadra 840AV computers.

DISCUSSION -----

The Quadra 840AV and Centris 660AV are the first Macintosh computers that include a Digital Signal Processor (DSP) chip integrated on the logic board.

Apple uses an AT&T DSP3210 chip for both models, the only difference being the clock frequency which is 55 Mhz on Centris 660AV and 66.7 Mhz on the Quadra 840AV.

The DSP implementation on the Quadra 840AV and Centris 660AV uses it's own multitasking operating system (the Apple Real-Time Architecture or ARTA) but shares the same memory as the host CPU, the 68040. The Quadra 840AV and Centris 660AV are truly dual processor Macintosh computers, as both the 68040 and the DSP have equal access to system resources.

The DSP on the Quadra 840AV and Centris 660AV is primarily responsible for performing real time processing of tasks such as speech recognition, sound, analog modem signal processing, or any other time-correlated data. The DSP can also be programmed to perform non real-time (also called timeshare) tasks such as image processing.

Real-Time versus Timeshare Processing

The difference between real-time and timeshare processing is that real-time tasks such as speech recognition requires guaranteed processing bandwidth.

Timeshare tasks are processes that don't involve a time dependency such as image manipulation or number crunching. Timeshare tasks are processed whenever there is excess DSP bandwidth not being used by a real-time process.

Please note that real-time tasks will not necessarily execute faster than timeshare tasks. In many cases, timeshare tasks will get more of the processing bandwidth and will complete sooner than real-time tasks. Real-time refers to tasks that need a specific amount of data to be processed during a specific amount of time.

Sound Manager 3.0, Speed Recognition API, and the Communication Toolbox utilize the DSP, but for an application to do more than sound, telecommunications, and speech recognition, it will have to be specifically written to use the Apple Real-Time Architecture manager.

Keywords: <None>

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19960215 11:05:19.00
Tech Info Library Article Number: 12706